

4235 Summer 08

Physiologic Adaptations to Pregnancy

Learning Objectives

Describe the physiologic changes that occur during pregnancy

Differentiate presumptive, probable and positive signs of pregnancy

Compute gravida, para and estimated date of delivery

Describe the initial and subsequent antepartal assessments

Describe common discomforts in pregnancy and describe measure that prevent or relieve them

Concepts

Oxygenation/Perfusion

Comfort/Pain

Elimination

Motion/Mobility

Nutrition/Fluids

Safety

Health Maintenance/Promotion

Introduction

From conception, changes occur in most every system of woman's body

Changes necessary to support fetus and prepare woman for childbirth

Nurse needs to understand changes and ways these changes affect daily lives of expectant women

Reproductive System

Uterus

- > Prior to pregnancy has about 10 mL capacity, at end of pregnancy capacity about 5000 mL
- > Growth occurs mainly because of hypertrophy
- > Grows in predictable pattern
 - Uterus @ symphysis pubis at 12 weeks
 - Uterus midway between pubis and navel @ 16 weeks
 - Uterus @ umbilicus by 20 weeks
 - Predictable growth provides info about fetal growth and confirm due date (EDD, EDB)
- > Contracts thru out pregnancy
- > Increased blood flow 2nd and 3rd trimesters to uterus and placenta

Cervix

- > Changes in color and consistency
 - Estrogen causes congestion, Chadwick's sign
 - Collagen fibers decrease, cause softening
- > Mucus glands proliferate, endocervix fills with mucus, blocks bacteria

Vagina

- > Bluish color, softens to allow distention
- > Increased vaginal discharge d/t increased mucus and rapid sloughing of vaginal cells
- > Glycogen rich conditions in vaginal cells favors yeast infection



Ovaries

- > Corpus luteum secretes progesterone first 6-7 weeks
- > Ovulation ceases; high levels of estrogen and progesterone inhibit release of FSH and LH needed for ovulation



Breasts

- > Changes in size and appearance d/t estrogen and progesterone
 - Mammary ductal tissue grows
 - Breast becomes highly vascular
 - Nipples increases in size, become more erect
 - Areola darkens in color
 - Montgomery's Tubercles become more prominent
 - Colostrum production begins



Cardiovascular System



Heart sounds

- > Often develop systolic murmur



Blood volume

- > Total blood volume increases by 50% by end of pregnancy compared to beforehand
- > Increased needed because
 - Transport nutrients and oxygen to placenta
 - Meet needs of expanded maternal tissue in uterus and breasts
 - Serves to protect woman from effects of blood loss in childbirth



Red blood cell volume

- > Increased production results in greater need for iron
- > Increases proportionately less than plasma

- > Dilution causes decline in hematocrit
 - Pseudoanemia or physiologic anemia
 - True anemia if Hgb < 11 g/dL
 - Dilution also decreases viscosity, threat of clot

⊙ Heart rate/ cardiac output

- > CO Increases rapidly in first trimester
- > Rate increases by about 10-20/min

⊙ Blood pressure

- > Despite increased blood volume, BP stays fairly stable r/t vasodilation d/t hormones
 - Decreases slightly in 2nd trimester, returns to pre-pregnancy level by end of 3rd trimester
- > BP lowest in lateral recumbent, higher when sitting, highest when standing
- > Supine hypotension
 - During second half of pregnancy, if woman supine, weight of uterus restricts flow of vena cava and descending aorta, hypotension results
 - Symptoms: dizziness, faintness, pallor, syncope
 - Lateral position, HOB up, wedge clients to avoid

⊙ Blood components

- > WBC increase during pregnancy, increase more during labor and postpartum
- > Fibrinogen levels increase
 - Prevents hemorrhage during childbirth but increases risk for clots

- ⊙ Respiratory System
- ⊙ Oxygen consumption increases by 15-20%
 - To compensate, woman breathes deeper
- ⊙ Physical changes
 - Diaphragm displaced by uterus, decreases volume of lungs
 - To compensate, ribs flare and circumference of chest expands by about 6 cm

- ⊙ Gastrointestinal System
- ⊙ Cardiac sphincter tone decreases
 - Result is reflux and heartburn
- ⊙ Intestines
 - Slower peristaltic movement leads to constipation, hemorrhoids
- ⊙ Gallbladder
 - GB hypotonic, delayed emptying, results in thicker bile and stone development
- ⊙ Abdominal Wall
 - Abdominal muscles may separate in third trimester d/t stretching
 - Called diastasis recti

- ⊙ Urinary System
- ⊙ Bladder
 - In first and third trimesters, pressure on bladder by uterus causes frequency, urgency
- ⊙ Kidneys
 - Increase blood flow thru kidney by 35-60 %



Integumentary System



Increased activity of sweat and sebaceous glands d/t greater blood flow

- > Facial blemishes occur



Pigmentation

- > Develop chloasma, linea nigra
- > More likely in dark skinned women



Connective tissue

- > Striae gravidarum (stretch marks)



Musculoskeletal System



Postural changes

- > Hormones cause greater mobility of pelvic ligaments and joints to facilitate passage of fetus thru pelvis
 - Results in pelvic instability creating the “waddle”
- > As uterus grows, mom leans backward to compensate for change in center of gravity
 - Creates lordosis, backache



Hormones in Pregnancy



Human Chorionic Gonadotropin (hCG)

- > Produced by cells around embryo
- > Stimulates corpus luteum to produce progesterone until placenta takes over
- > Causes positive pregnancy test



Estrogen

- > Stimulates uterine growth, increases blood supply

- > Aids in preparation of breast for lactation
- > Causes hyperpigmentation, nasal congestion

● Progesterone

- > Produced first by corpus luteum, then placenta
- > Is most important hormone of pregnancy
 - Maintains endometrium for implantation
 - Relaxes smooth muscle, preventing abortion
 - Facilitates storage of maternal fat

● Human Placental Lactogen (hPL)

- Increases availability of glucose to fetus by decreasing sensitivity of maternal cells to insulin

● Confirmation of Pregnancy

● Sign & symptoms of pregnancy divided into three classifications

- > Presumptive
- > Probable
- > Positive

● Presumptive

- > Are subjective changes woman experiences and reports
 - Amenorrhea
 - Nausea & vomiting
 - Fatigue
 - Urinary frequency
 - Breast and skin changes
 - Fetal movement

⊙ Probable

- Objective finding documented by examiner
 - Abdominal enlargement
 - Cervical softening (Goodell's sign)
 - Color changes of cervix (Chadwick's sign)
 - Uterine changes (size, consistency)
 - Pregnancy tests

⊙ Positive

- Fetal heart sounds
- Fetal movement felt by examiner
- Visualization of the fetus

⊙ Antepartal Assessment and Care

⊙ Prenatal care involves identifying potential problems and patient education

- Is adequate if begins in first trimester and continues on regular basis thereafter
- Positive correlation between lack of care and infant mortality rates

⊙ Woman should ideally have preconception visit

- History and physical
- Update immunizations
- Discuss avoidance of potential teratogens
- Begin folic acid

⊙ Initial visit

- History

- Obstetric
- Menstrual history
- Contraceptive history
- Medical and surgical history
- Family history
- Psychosocial history
- > Risk Assessment
- > Head to toe physical exam
 - VS
 - Height, weight
 - Lab tests
 - Blood typing and Rh factor
 - CBC
 - VDRL or RPR
 - Rubella titer
 - TB skin test
 - Sickle cell screen if AA
 - Hepatitis B
 - HIV
 - Urinalysis
 - Pap smear
 - STI cultures
 - Triple Screen
 - Maternal blood glucose @ 24-28 weeks , initial visit if risk factors

⊙ Subsequent visits

- > Frequency in normal pregnancy
 - Conception to 28 weeks, visits q 4 weeks

- 29-36 weeks, visits q 2 weeks
- 36 weeks to delivery, visits weekly

> Perform

- VS
- Weight
- Urinalysis
- Fundal height
- Assess FHR and fetal activity

> Provide education, answer questions

- “Danger Signs”
- Hot tubs and saunas
- Douching
- Breast care
- Clothing
- Exercise
- Sleep and rest
- Sexual activity
- Employment
- Travel
- Immunizations
- Use of OTC and prescription meds, CAM, tobacco, alcohol, illegal drugs

- ⊙ Danger Signs During Pregnancy
- ⊙ Vaginal bleeding, with or without discomfort
- ⊙ Rupture of membranes
- ⊙ Swelling of the fingers, puffiness of the face or around the eyes
- ⊙ Continuous, pounding headache
- ⊙ Visual disturbances (blurred vision, dimness, spots)

- Persistent or severe abdominal pain
- Chills or fever
- Painful urination
- Persistent vomiting
- Changes in frequency or strength of fetal movements
- Common Discomforts of Pregnancy
- Nausea and vomiting
- Heartburn
- Backache
- Round ligament pain
- Urinary frequency
- Varicose veins
- Hemorrhoids
- Constipation
- Leg cramps